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Lin

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(54) **REFRACTIVE SURGERY AND PRESBYOPIA CORRECTION USING INFRARED AND ULTRAVIOLET LASERS**

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(58) **Field of Search** 606/4–6, 10–12, 606/13, 16, 17; 128/898; 351/204, 206–212; 372/24–26; 359/333, 343, 345

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(57) **ABSTRACT**

A method and surgical technique for corneal reshaping and for presbyopia correction are provided. The preferred embodiments of the system consists of a scanner, a beam spot controller and coupling fibers and the basic laser having a wavelength of (190–310) nm, (0.5–3.2) microns and (5.6–6.2) microns and a pulse duration of about (10–150) nanoseconds, (10–500) microseconds and true continuous wave. New mid-infrared gas lasers are provided for the corneal reshaping procedures. Presbyopia is treated by a method which uses ablative laser to ablate the sclera tissue and increase the accommodation of the ciliary body. The tissue bleeding is prevented by a dual-beam system having ablative and coagulation lasers. The preferred embodiments include short pulse ablative lasers (pulse duration less than 200 microseconds) with wavelength range of (0.15–3.2) microns and the long pulse (longer than 200 microseconds) coagulative lasers at (0.5–10.6) microns. Compact diode lasers of (980–2100) nm and diode-pumped solid state laser at about 2.9 microns for radial ablation patterns on the sclera ciliary body of a cornea are also disclosed for presbyopia correction using the mechanism of sclera expansion.

15 Claims, 3 Drawing Sheets